Space Weather Forecast

Issued on Saturday, 12 February 2022 at 00:50 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Effects of 06 February CME beginning to wane. Chance of fast wind and Minor Geomagnetic Storm G1 over the weekend.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the last 24 hours, with only minor common class flares observed. There are currently six numbered sunspots on the visible disk, with a strong bias in population towards the western solar horizon and appear to be unipolar, which include AR2940 and AR2939. The largest is AR2941 in the northwest and continues to show growth in its intermediate spots, but is otherwise stable. Meanwhile, AR2946 in the southeast continues to rotate around into the southeast quadrant. The remaining sunspots are small and stable, or about to rotate off the disc. There are numerous filaments visible in imagery. One of the most noteworthy events of the period occurred at 11/1200 UTC with a filament eruption in the southwest quadrant, with coronal dimming observed in imagery. Simultaneously, another area of coronal dimming was observed in the northwest quadrant. This event produce a CME, which is yet to be analysed. No Earth-directed Coronal Mass Ejections (CMEs) were in evidence in the period.

Solar Wind / Geomagnetic Activity: Solar winds as measured DSCOVR at L1 began the period at slow-ambient levels, near 380km/s, but increased to become Elevated, with speeds reaching up to 550km/s by the end of the period. The magnetic field (IMF) was predominately at moderate levels at the start of the period, briefly increasing to strong levels at 11/1736 UTC, before declining to the current weak levels. The all important north-south component (Bz) was mostly positive (northward), with a period of negative (southward) orientation between 11/1747UTC and 11/2145UTC. The net result of the above solar wind measures are probably indicative of the tail end of the CME, which left the Sun on 06 February, with onset at L1 from 09/2013UTC. Geomagnetic activity as a result has been mostly Active to Unsettled (Kp3-4) during the period.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to remain low through the next four days. Sunspot regions are expected to be in a state of flux in the period, with numerous departures and arrivals on the facing side, and confidence is therefore low. Common class flares are likely at 70%, with a slight chance (20%) of moderate class.

Solar Wind / Geomagnetic Activity: The only CME in the current forecast remains the 06 February CME - ongoing since 09/2010UTC. This is expected to begin waning going into day 1 (Saturday 12 Feb). However, this is likely to be short-lived as a fast wind from a coronal hole is expected to arrive, probably later on day 1 (12 Feb) and lasting into day 2 and day 3 (13 and 14 Feb), with speeds perhaps reaching 600km/s, before slowly declining into day 4 (15 Feb).

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Met Office Space Weather Forecast

Geomagnetic activity is expected to start Active due to residual 06 February CME effects - especially given the current elevated wind speeds, density and IMF, with a Slight Chance of G1/Minor Storm early on day 1 (Saturday 12 February). Mainly Quiet to Unsettled conditions should follow for a time, perhaps becoming Active again later Saturday and into Sunday 13 February, with isolated G1/Minor Storm intervals on onset. Probably staying Active to Unsettled on day 3 (14 Feb), before conditions become Quiet to Unsettled by day 4 (15 Feb) as fast wind from a coronal hole begins to wane.

Energetic Particles / Solar Radiation: There is a daily 5% slight chance of S1 given any significant flares from the sunspot regions in the western hemisphere, reducing into the new working week as they disappear.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	20	40	30	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	20	20	20	20
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)

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Active	**≥ S1**	No	5	5	2	2
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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